

2. Claim Rejections - 35 U.S.C. § 103

The Examiner has rejected claims 1, 3-6 and 10 under 35 U.S.C. § 103(a) as being unpatentable over Pham *et al.* (US 5,300,960) ["Pham"] in view of Murayama *et al.* (US 6,130,700) ["Murayama"]. For at least the following reasons, Applicant respectfully traverses the rejection.

Claim 1 recites a driving method for an optical printer that comprises "determining time lengths of lighting the individual light emitting elements in accordance with tonal levels of pixels to print that are represented by the image data; and changing luminance of the respective light emitting elements according a predetermined characteristic curve as the determined lighting time for each pixel elapses." The Examiner concedes that Pham does not disclose the claimed changing luminance but applies Murayama to allegedly cure the deficiency.

With respect to Murayama, the Examiner contends the following:

However, it is noted that Pham '960 does not explicitly stated varying the brightness for the light emitting elements during the *determined* exposure time (i.e., changing luminance of the respective light emitting elements as the determined lighting/exposure time for each pixel elapses) as set forth in the present claimed invention.

However, the above-mention claimed limitations are well known in the art as evidenced by Murayama '700. In particular, Murayama '700 teaches the use of an exposure control unit (i.e., see Figs. 4 and 6, the elements 20 and 25; see col. 17, lines 10+) for *determining* time length of lighting the individual light emitting elements (i.e., LED1-LED4) in accordance with tonal level (i.e., noted the time length of lighting each of the LED1-LED4 is cyclically increased or decreased by different level based on the tonal level as shown in Figs. 10 and 11; see col. 18, lines 60+) and changing luminance of the respective light emitting elements (i.e., noted that light emitting elements LED 1 -LED4 are simultaneously strikes each dot; see col. 18, lines 35+) according a predetermined characteristic curve (i.e., Fig. 11) as the determined lighting time (i.e., the determined exposure time; noted that the exposure apparatus 20 and the CPU 25 is capable of determining the lighting/exposure time for the individual LED based on the gradations level of the pixels to print; see

col. 5, lines 60+ and col. 11, lines 25+) for each pixel (i.e., each dot) elapses (i.e., In col. 4, lines 65-col. 5, lines 2; Murayama '700 clearly stated that "it is possible to cope with a lightness change or a color tone change according to user's taste by **the power control portion controlling the brightness of the light-emitting elements**; see col. 5, lines 1-10. In particular, the brightness of the respective light emitting elements is changed by dynamically controlling the value of current supplied to the LEDs 31. through the CPU 25 during the determined exposure time based on the predetermined characteristic curve of the gradation data; see col. 10, lines 1-30, col. 11, lines 10+ and col. 12, lines 40-46). In view of this, it would prevent uneven color development in a printed image and therefore prevents deterioration of image quality (i.e., see col. 19, lines 10-15).

In view of the above, having the system of Pham '960 and then given the well-established teaching of Murayama '700, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Pham '960 varying the brightness for the light emitting elements during the exposure time as taught by Murayama '700, since Murayama '700 stated in col. 19, lines 10+ such a modification would prevent uneven color development in a printed image and therefore prevents deterioration of image quality.

Office Action at pages 5-6. (italics and bold in original, underline added for emphasis.)

As an initial matter, Applicant notes that the Examiner has fundamentally changed the rejection with respect to which element in Murayama allegedly performs the claimed changing luminance of the respective light emitting elements. In the Office Action of June 23, 2005, the Examiner contended that "the brightness for the light emitting elements LED1-LED4 is changed by varying the exposure duration." The exposure duration is controlled by the time control portion (col. 4, lines 11-16). Applicant also notes that the Examiner did not rebut Applicant's argument that LED1-LED4 do not change in brightness merely because the exposure duration is changed.

In this Office Action, the Examiner withdraws the contention that "the brightness for the light emitting elements LED1-LED4 is changed by varying the exposure duration" and

adds the underlined portion given above. The relevant features of the underlined portion are performed by the power control portion, not the time control portion, which formed the basis of the earlier rejection. Therefore, Applicant submits that the finality of this Office Action is improper.

With respect to the Examiner's contention that the power control portion of Murayama performs the claimed changing luminance of the respective light emitting elements, Applicant submits that the Examiner has misinterpreted the teachings of the Murayama, and that Murayama teaches away from the claimed changing of the luminance of the respective light emitting elements as the lighting time for each pixel elapses.

Murayama discloses:

The power supplying circuit 23, which controls the power supplied to the LEDs 31, has a D/A converter 39 for converting a set value D_s supplied from the CPU 25 in the form of a digital signal, into an analog signal, and an operational amplifier 38 for maintaining an electric potential on the base side of each transistor switch 32 at a set voltage V_s supplied from the D/A converter 39, and pull-up resistors 37 for limiting the current at the time of control of the transistor switch 32. In the light source unit 29R of this embodiment, when the timing signal from the timing generating circuit 24 becomes open collector, the base-side electric potential of the transistor switch 32 is raised by the set voltage V_s supplied from the D/A converter 39, so that the transistor switch 32 turns on. The LED 31 thereby emits light. The current through the transistor switch 32, that is, the current supplied to the corresponding LED 31, increases until the electric potential caused by a voltage drop of the emitter resistor 36 reaches the set voltage V_s. When the set voltage V_s is reached, that current value is maintained.

Murayama at col. 9, lines 33-51. (emphasis added.)

From the above description, it is clear the LEDs are maintained at a constant brightness because the current is maintained constant. The value of the current depends on

value V_s , which is derived from D_s . Murayama discloses the D_s set value is obtained as follows:

The exposure apparatus 20 of this embodiment is capable of receiving from the host apparatus via the buffer 19, data regarding photosensitive sheet sensitivity variation, and data regarding image lightness (brightness and/or clearness) in accordance with user's taste, and updating the data in the ROM 27 with the received data, and holding the updated data. Therefore, the set values D_s calculated on the basis of the interior temperature of the exposure head 15 can be further adjusted with the conditions in printing environments, such as photosensitive sheet sensitivity variation, image lightness and the like, to calculate **final values D_s using those factors.** The **final set values D_s are supplied to the light source units 29R, 29G, 29B.**

Murayama at col. 10, lines 50-62. (emphasis added.)

Therefore, Applicant submits that, although the set values for the LEDs are adjustable based on a variety of factors, once set, Murayama does not disclose or suggest that the values are changed during the exposure as contended by the Examiner. Murayama clearly discloses that “the exposure apparatus 10 of this embodiment dynamically controls the power to the LEDs 31 by controlling the current or voltage supplied to the LEDs 31 on the basis of temperature so that the brightness of the LEDs 31 is maintained at a constant level when the temperature changes.” (Col. 12, lines 7-11, emphasis added.)

In addition, Fig. 5 and the related portion in Murayama's disclosure (col. 11, line 66-col. 12, line 60) clearly teach that the brightness of the LEDs is not changed during exposure. Although the system in Murayama changes the set value D_s of the current or voltage supplied to the LEDs (31) based on the temperature difference and the like, D_s is calculated in steps ST 2 and ST 3 (Fig. 5), which is before exposure (step ST 5). The system in Murayama then goes back to step ST 1 after exposure to recalculate D_s (col. 12, lines 58-60). Accordingly, Applicant

submits that any change to the brightness setpoint of the LEDs is between exposures, not during exposure.

To summarize, Murayama discloses that the power control portion, which controls the brightness of the LEDs, is set to a value based on factors such as temperature, sensitivity of the photosensitive sheet and user preference (col. 10, lines 50-62). The photosensitive sheet is then exposed based on the set value for the duration of the exposure (see col. 5, lines 65-67). The power control portion is designed to maintain constant brightness on the LEDs (col. 12, lines 7-11, see also col. 4, lines 53-60). Therefore, contrary to the Examiner's contentions, Murayama does not teach that the brightness of the LEDs is changed during exposure. In fact, Murayama teaches the exact opposite.

Accordingly, Applicant submits that Pham in view of Murayama does not disclose or suggest "changing luminance of the respective light emitting elements according a predetermined characteristic curve as the determined lighting time for each pixel elapses," as set forth in claim 1. (emphasis added.)

Applicant submits that claims 3-6 and 10 are patentable at least by virtue of their dependency on claim 1.

In addition, claim 3 recites that "the luminance of the light emitting elements is changed with time at a constant rate" The Examiner cites various section of Pham and Fig. 11 of Murayama as allegedly disclosing this feature.

Applicant submits that any reliance on Pham for teaching the claimed constant rate of change for the luminance is improper since the Examiner has already admitted that Pham does not disclose changing the brightness of the LEDs during the exposure period (Office Action at page 5). Fig. 11 of Murayama merely discloses a relationship between the gradation level and the amount of exposure, not a constant rate of change for the luminance. There is no disclosure or suggestion in Pham or Murayama (taken alone or in combination) that discloses or suggests the claimed constant rate of change as set forth in claim 3.

Claim 4 recites that “the luminance of the light emitting elements is changed with time for recording each pixel according to a non-linear curve.” The Examiner cites various sections of Pham and Figs. 10 and 11 of Murayama as allegedly disclosing this feature.

Applicant submits that any reliance on Pham to teach the claimed change of the luminance of the light emitting elements is inappropriate based on the Examiner’s admission that Pham does not disclose changing the brightness of the LEDs during the exposure period. Fig. 11 of Murayama merely discloses a relationship between the gradation level and the amount of exposure, not a change of luminance according to a non-linear curve. Fig. 10 of Murayama merely discloses the control states of the LEDs, i.e., “1s” and “0s.” There is no disclosure in Pham and Murayama (taken alone or in combination) of the claimed changing of the luminance of the light emitting elements with time to a non-linear curve as set forth in claim 4.

The Examiner has rejected claim 2 under 35 U.S.C. § 103(a) as being unpatentable over Pham in view of Murayama and further in view of Masubuchi *et al.* (US. 6,262,757) ["Masubuchi"]. For at least the following reason, Applicant respectfully traverses the rejection.

Because Masubuchi does not cure the deficient teachings of Pham in view of Murayama given above with respect to claim 1, Applicant submits that claim 2 is patentable at least by virtue of its dependency on claim 1.

The Examiner has rejected claims 7 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Pham in view of Murayama. For at least the following reason, Applicant respectfully traverses the rejection.

Because independent claim 7 recites features similar to those given above for claim 1 and because the Examiner's rejection is similar to that given above for claim 1, Applicant submits that claim 7 is patentable for at least reasons similar to those given above with respect to claim 1.

Applicant submits that claim 11 is patentable at least by virtue of its dependency on claim 7.

The Examiner has rejected claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Pham in view of Murayama and further in view of Nakatani (US 6,373,514) ["Nakatani"]. For at least the following reason, Applicant respectfully traverses the rejection.

Because Nakatani does not cure the deficient teachings of Pham in view of Murayama given above with respect to claim 7, Applicant submits that claim 8 is patentable at least by virtue of its dependency on claim 7.

The Examiner has rejected claim 9 under 35 U.S.C. § 103(a) as being unpatentable over Pham in view of Murayama and Nakatani and further in view of Masubuchi. For at least the following reason, Applicant respectfully traverses the rejection.

Because Nakatani does not cure the deficient teachings of Pham in view of Murayama and Nakatani given above with respect to claim 8, Applicant submits that claim 9 is patentable at least by virtue of its dependency on claim 8.

II. Allowable Subject Matter

Applicant thanks the Examiner for maintaining that claims 12-15 would be allowable if rewritten in independent form.

Applicant holds rewriting these claims in abeyance until the subject matter of their respective base claims is resolved.

III. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Response under 37 C.F.R. § 1.116
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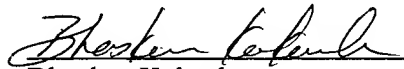
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